

LQCD-ext III Project Report

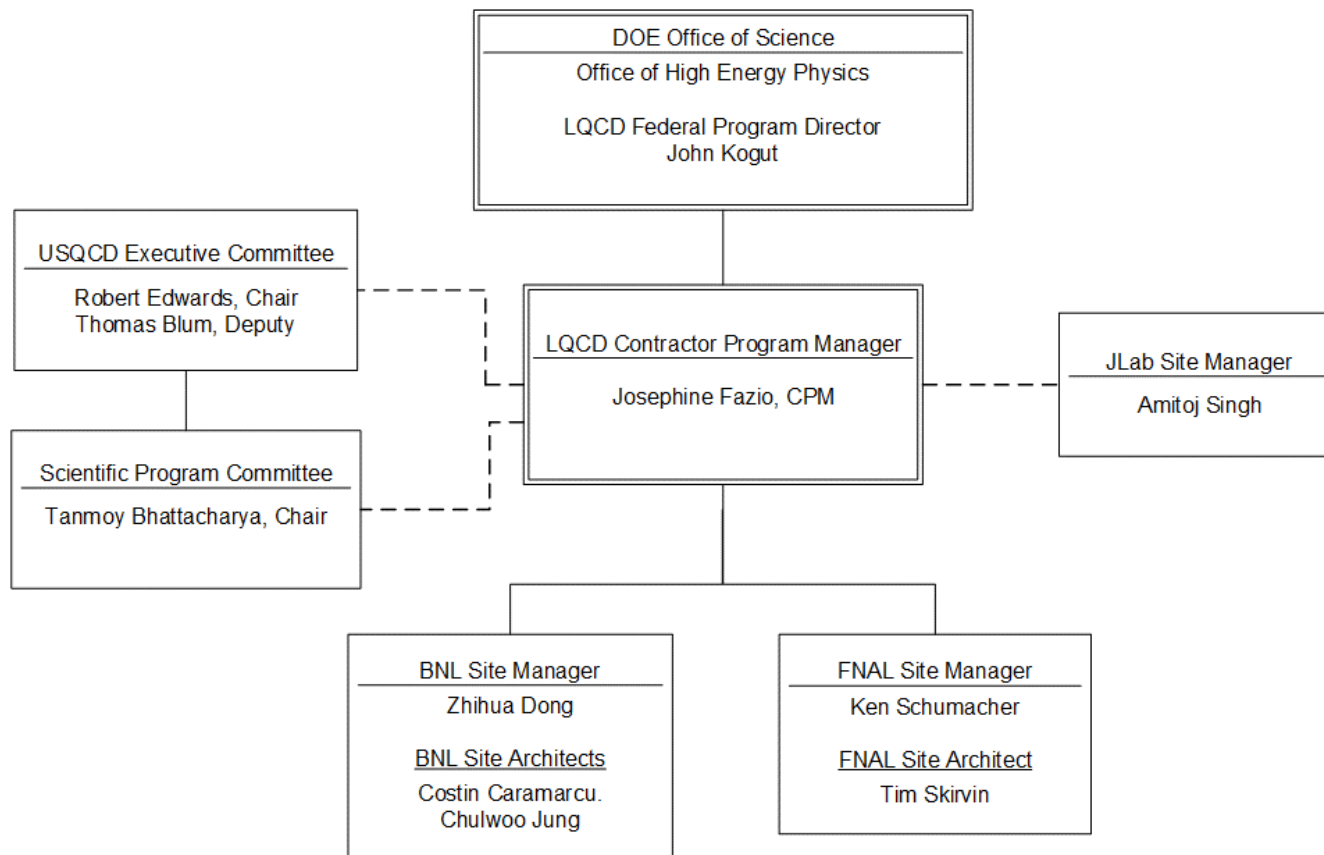
Jo Fazio
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JFazio@fnal.gov

USQCD All-Hands Meeting
Apr 21-22, 2022

Outline

- ▶ Organizational update
- ▶ Highlights over the past 12 months
- ▶ Results from 2021 DOE annual review
- ▶ User survey results and feedback

LQCD-ext III Integrated Project Team (IPT)

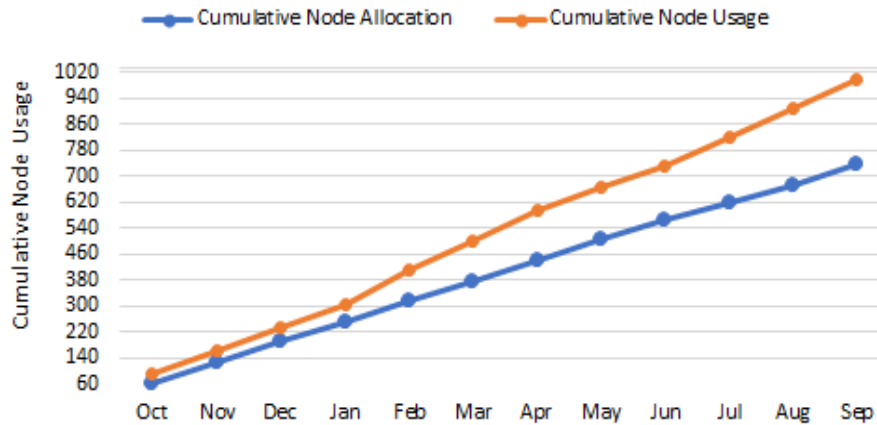


Organizational changes since last year:

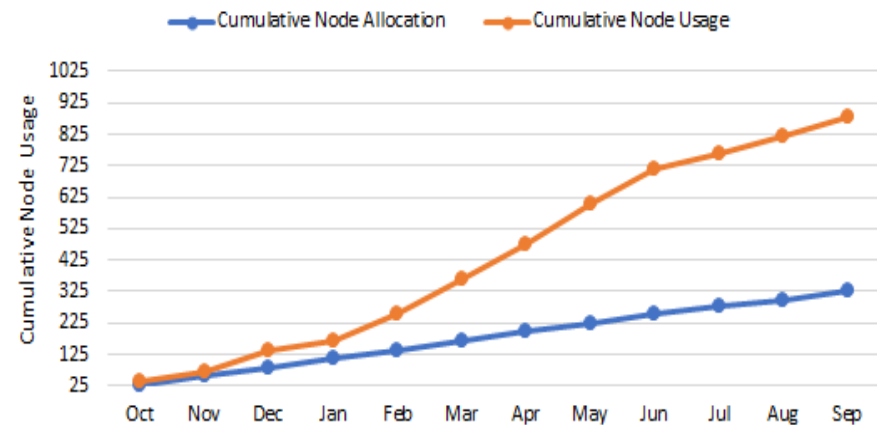
- Jo Fazio is CPM
- Robert Edwards is EC Chair
- Thomas Blum is EC Deputy
- Tanmoy Bhattacharya is SPC Chair
- Tim Skirvin is FNAL Site Architect

Utilization of our FY21 Allocations – BNL

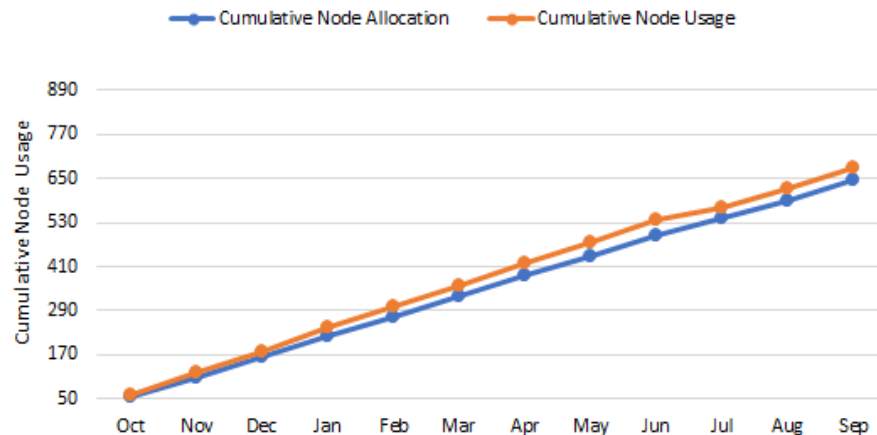
BNL-IC Cumulative Node Usage by Month



BNL-KNL Cumulative Node Usage by Month



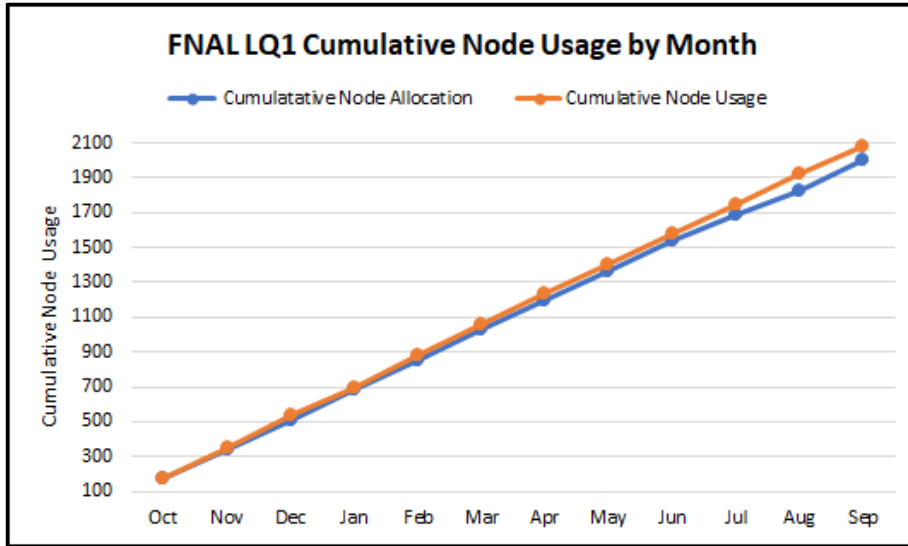
BNL-SKY Cumulative Node Usage by Month



FY21: Oct thru Sep:

System	Node Allocation	% of Cumulative Allocation Used
BNL-IC	63	136%
BNL-KNL	28	268%
BNL-SKY	55	105%

Utilization of our FY21 Allocations – FNAL

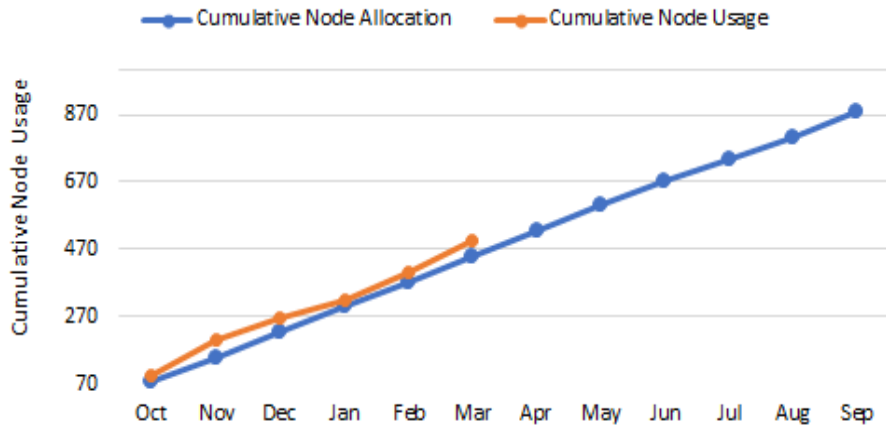


FY21: Oct thru Sep:

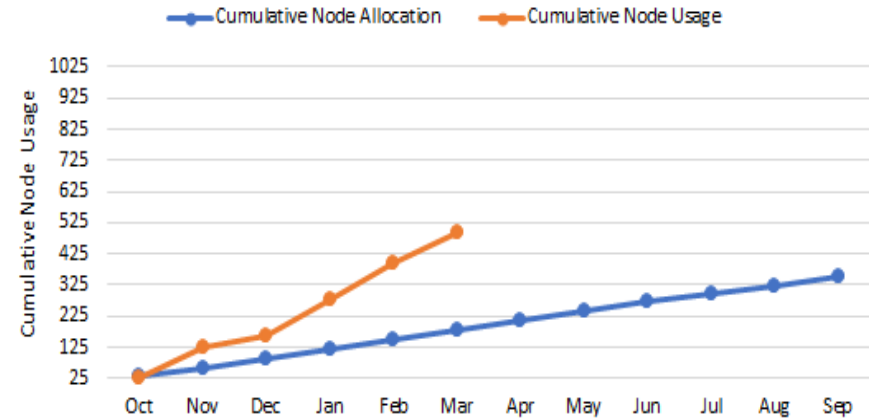
System	Node Allocation	% of Cumulative Allocation Used
FNAL-LQ1	171	104%

Utilization of our FY22 Allocations – BNL

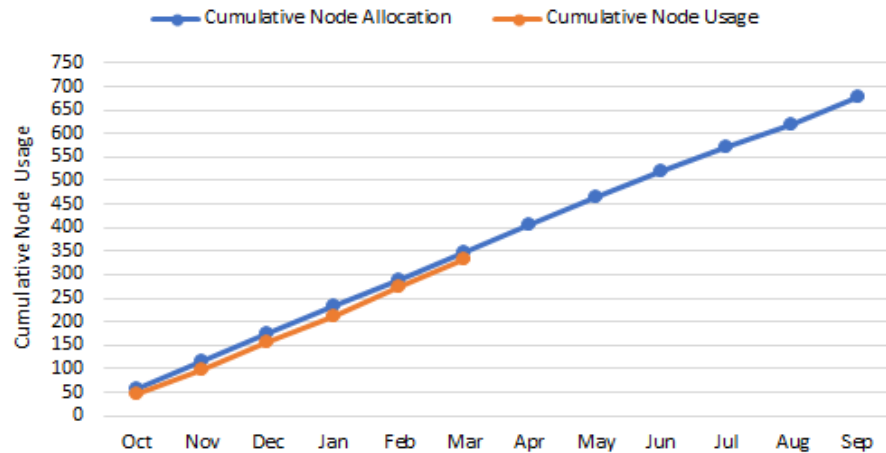
BNL-IC Cumulative Node Usage by Month



BNL-KNL Cumulative Node Usage by Month



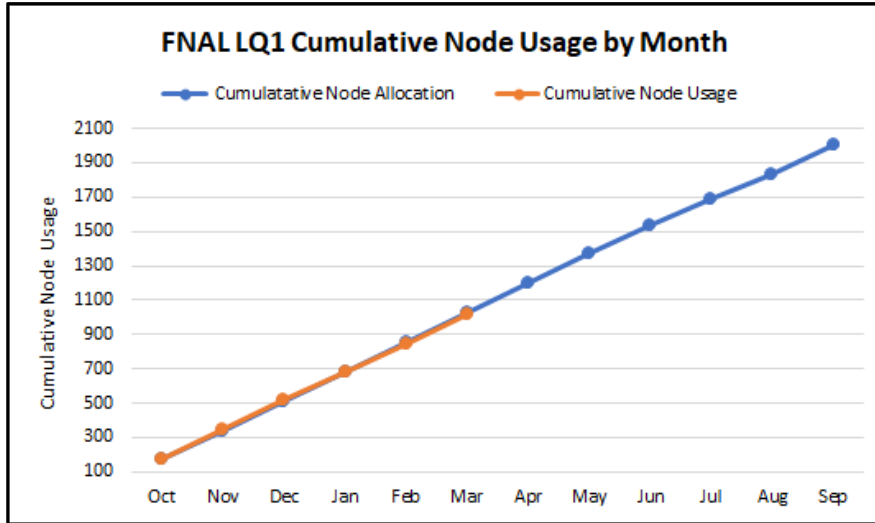
BNL-SKY Cumulative Node Usage by Month



FY22: Oct thru Mar:

System	Node Allocation	% of Cumulative Allocation Used
BNL-IC	75	110%
BNL-KNL	30	274%
BNL-SKY	58	96%

Utilization of our FY22 Allocations – FNAL



FY22: Oct thru Mar:

System	Node Allocation	% of Cumulative Allocation Used
FNAL-LQ1	171	99%

Project Usage through Apr 20: BNL-IC, Sky, and KNL

Institutional Cluster

(Sky Core Hours)

*1 K80 GPU Hour = 33.25 SkyCore Hours
updated: 2022-04-20 00:06:09

Cluster	Account	Start Date	End Date	Allocation	Allocation Usage	Allocation Usage(%)	Scavenger Usage			
Annie-IC	lqcd-21-22	2021-07-01	2022-06-30	41,037,948	36,336,433	88.54%	3,028,157			
Project	Original SPC Allocation	Adjustment	Adjusted SPC Allocation	Usage	Progress(%)	Remain	30Day Usage	30Day BurnRate		
1	qgpd-21-22	2,893,250	1,097,315	3,790,565	3,071,031	81.02%	719,534	246,141	6.49%	
2	axialgpu-21-22	2,793,000	982,903	3,775,903	3,203,396	84.84%	572,508	48,133	1.27%	
3	exclhvp-21-22	6,284,250	2,233,356	8,517,606	8,499,129	99.78%	484,332	0	0.00%	
4	thermo-21-22	831,250	234,527	1,065,777	1,823,884	171.13%	11,144	0	0.00%	
5	stagemug-2-21-22	9,276,750	1,782,244	11,058,994	9,709,852	87.80%	1,349,143	2,516,650	22.76%	
6	sextet-21-22	2,560,250	(403,086)	2,157,164	1,108,149	51.37%	1,049,015	261,641	12.13%	
7	piogpd-21-22	2,427,250	909,005	3,336,255	5,830,419	174.76%	0	682,665	20.46%	
8	a1res-21-22	1,662,500	377,194	2,039,694	980,906	48.09%	1,058,787	0	0.00%	
9	nucstructclover-21-22	3,724,000	1,571,805	5,295,805	5,137,825	97.02%	157,980	0	0.00%	
10	class-c-nplqcd	8,313	0	8,313	0	0.00%	8,313	0	0.00%	
11	UnAllocated:	8,777,136	(8,785,263)	-8,128	0	0.00%	0	0	0.00%	

Skylake Cluster

(Sky Core Hours)

updated: 2022-04-20 00:06:09

Cluster	Account	Start Date	End Date	Allocation	Allocation Usage	Allocation Usage(%)	Scavenger Usage			
Skylake	lqcd-sky-21-22	2021-07-01	2022-06-30	17,623,872	13,408,263	76.08%	0			
Project	Original SPC Allocation	Adjustment	Adjusted SPC Allocation	Usage	Progress(%)	Remain	30Day Usage	30Day BurnRate		
1	qgpd-sky-21-22	3,600,000	264,011	3,864,011	3,139,417	81.25%	724,594	597,477	15.46%	
2	axialgpu-sky-21-22	3,500,000	(447,583)	3,052,417	3,049,791	99.91%	2,626	960,974	31.48%	
3	stagemug-2-sky-21-22	5,500,000	1,116,026	6,616,026	6,615,463	99.99%	563	44,620	0.67%	
4	vcbok-sky-21-22	2,500,000	(932,453)	1,567,547	603,592	38.51%	963,955	0	0.00%	
5	UnAllocated:	2,523,872	(1)	2,523,871	0	0.00%	0	0	0.00%	

KNL Cluster

(Sky Core Hours)

*1 KNL CoreHour = 0.563 SkyCore Hours
updated: 2022-04-20 00:03:30

Cluster	Account	Start Date	End Date	Allocation	Allocation Usage	Allocation Usage(%)	Scavenger Usage			
Frances-KNL	lqcd-knl-21-22	2021-07-01	2022-06-30	9,095,630	19,043,656	209.37%	0			
Project	Original SPC Allocation	Adjustment	Adjusted SPC Allocation	Usage	Progress(%)	Remain	30Day Usage	30Day BurnRate		
1	k2pipipbc-knl-21-22	6,193,000	0	6,193,000	5,856,705	94.57%	336,295	925,506	14.94%	
2	stagscale-knl-21-22	7,994,600	0	7,994,600	7,784,691	97.37%	209,909	617,433	7.72%	
3	qcdqedta-knl-21-22	2,702,400	0	2,702,400	5,400,754	199.85%	0	1,128,952	41.78%	
4	class-c-2betadecay-knl-21-22	1,182,300	0	1,182,300	1,506	0.13%	1,180,794	0	0.00%	
5	UnAllocated:	-8,976,670	0	-8,976,670	0	0.00%	0	0	0.00%	

<https://monitoring.sdcc.bnl.gov/pub/allocation/lqcd.html>

Project Usage through Apr 20 : FNAL – LQ1

Project Name	Cluster	SPC Original Allocation (Sky-Core-Hours)	Adjustments (Sky-Core-Hours)	SPC Adjusted Allocation (Sky-Core-Hours)	Project Used as of Jul 1, 2021 (Sky-Core-Hours) *	Progress against Adjusted Allocation	Remaining Allocation (Sky-Core-Hours)	30-day usage as of 04/20/2022
chiqcd	FNAL-LQ1	9,000,000	3,617,595	12,617,595	12,453,510	99%	164,085	725,199
fourpluseight	FNAL-LQ1	6,000,000	1,172,139	7,172,139	7,235,590	101%	0	1,236,925
nplqcd	FNAL-LQ1	4,500,000	2,328,054	6,828,054	6,840,582	100%	0	521,763
lp3	FNAL-LQ1	14,000,000	-2,221,216	11,778,784	6,797,631	58%	4,981,153	516,726
milight	FNAL-LQ1	8,500,000	421,242	8,921,242	6,423,137	72%	2,498,105	436,196
rhqbbbar	FNAL-LQ1	2,700,000	597,801	3,297,801	2,767,941	84%	529,860	250,384
vcbok	FNAL-LQ1	-	-	-	1,593,347	-	-	-
ahisq	FNAL-LQ1	2,000,000	-298,458	1,701,542	1,162,534	68%	539,008	345,823
safe	FNAL-LQ1	-	-	-	1,040,701	-	-	387,884
4fermi	FNAL-LQ1	3,500,000	-1,523,525	1,976,475	974,959	49%	1,001,516	3,216
heavylight	FNAL-LQ1	1,200,000	-279,572	920,428	655,126	71%	265,302	142,856
gluonpdf	FNAL-LQ1	500,000	-	500,000	570,143	114%	0	189,804
comphiggs	FNAL-LQ1	510,000	-	510,000	449,987	88%	60,013	103,073
hadtensor	FNAL-LQ1	450,000	-	450,000	379,913	84%	70,087	4,368
lgncqcd	FNAL-LQ1	375,000	-	375,000	353,084	94%	21,916	134,640
nme	FNAL-LQ1	-	-	-	334,570	-	-	-
qfenpct	FNAL-LQ1	500,000	-	500,000	174,013	35%	325,987	3,739
nedm	FNAL-LQ1	-	-	-	173,393	-	-	-
lqcdadmin	FNAL-LQ1	-	-	-	31,052	-	-	-
hisqvec	FNAL-LQ1	20,000	-	20,000	11,445	57%	8,555	1,025
largenc	FNAL-LQ1	20,000	-	20,000	9,091	45%	10,909	-
vacuumdecay	FNAL-LQ1	20,000	-	20,000	5,535	28%	14,465	-
nptmd	FNAL-LQ1	-	-	-	4,072	-	-	480
hadstruc	FNAL-LQ1	4,000,000	-3,814,060	185,940	218	0%	185,722	-
lattsusy	FNAL-LQ1	-	-	-	128	-	-	-
TOTAL	FNAL-LQ1	57,795,000	-	57,795,000	50,441,702	81.5%	10,676,683	5,004,101

<https://computing.fnal.gov/lqcd/cluster-status/>

<https://www.usqcd.org/fnal/clusterstatus/lq1/accounting.html>

2021 DOE Annual Review Recommendations

➤ Responses to FY21 DOE Recommendations

1. USQCD should conduct an anonymous survey to evaluate the Diversity, Equity, and Inclusion climate within the LQCD-ext III research program.
 - Status: Survey was conducted in January and results were sent to Will Detmold (CDEI Chair) and Robert Edwards (EC Chair) on February 1st
2. Questions should be added to the user survey that would allow users to comment on the SPC allocation process, fairness, and scientific impact.
 - Status: 5 additional questions were added to the Call for proposal/Resource allocation sections of the survey

2021 User Survey Summary

- Performance; 197 surveys sent; 83 responses received= 42% response rate
 - Our response significantly decreased from 60% to 42%

- The FY2021 initial Annual User Survey opened from September 28 to October 22, 2021
 - Responses were low therefore the survey was resent on October 25 to November 5

- The online survey consisted of 44 questions designed to measure the level of satisfaction with:
 - (a) the Compute Facilities operated and managed by the LQCD-ext. III project team
 - (b) the annual Resource Allocation and Call for Proposal process conducted and managed by the USQCD Scientific Program Committee

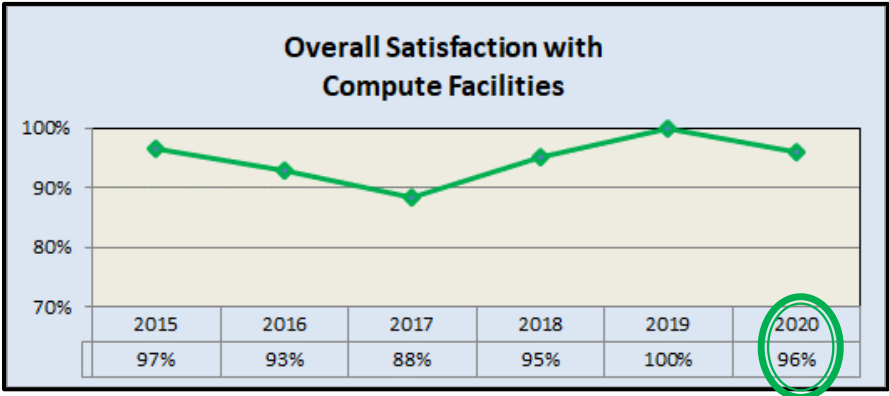
2021 User Survey Updates

- This year Jlab was added to the survey to ensure that members could provide feedback for all 3 labs and the different systems
- Listed below are the five additional questions that allowed users to comment on the SPC allocation process, fairness, and scientific impact. Adding additional questions was a recommendation from the DOE review.
 - Effectiveness with which the resource allocation process awarded time among projects of similar scientific value
 - Were you satisfied with the clarity and completeness of the CFP
 - Were you given enough time to prepare your proposal
 - Was the SPC report fair and constructive
 - In your opinion do the resource allocations reflect the scientific priorities of the DOE Offices of High Energy Physics and Nuclear Physics
- Overall comments provided positive feedback that reassured the project team and USQCD leadership that we are providing valuable services while also bringing to light necessary changes and reinforcing the changes that were underway.

2021 User Survey Results

➤ Compute Facilities Performance

- All sites combined scores met the 92%> KPI

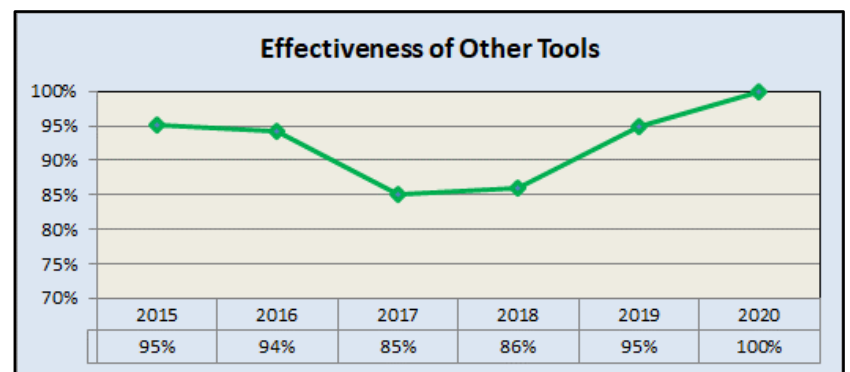
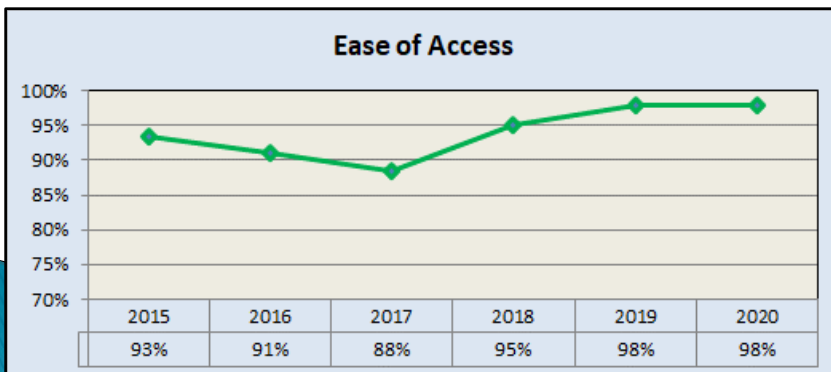
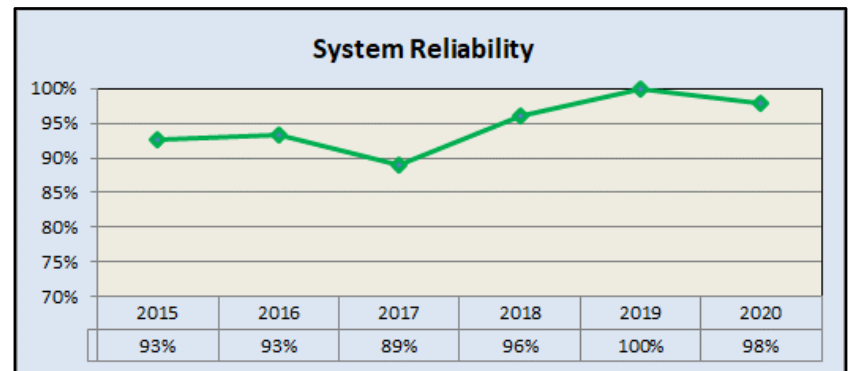
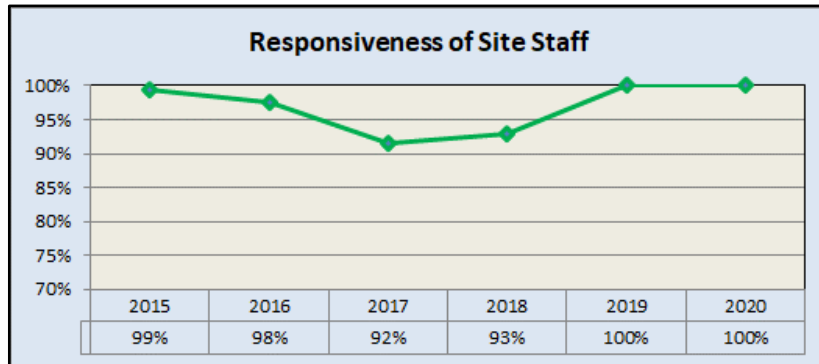
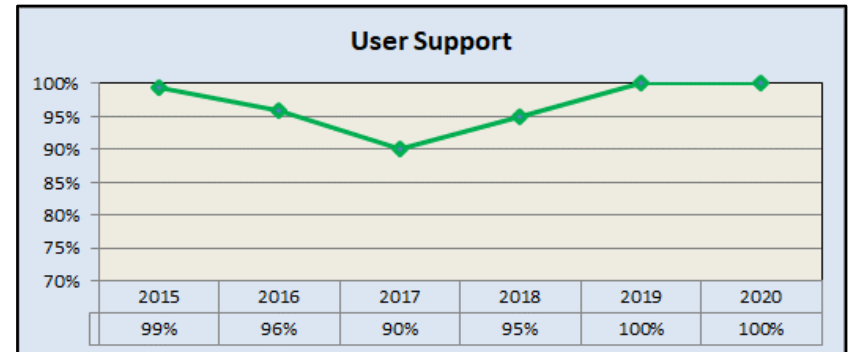
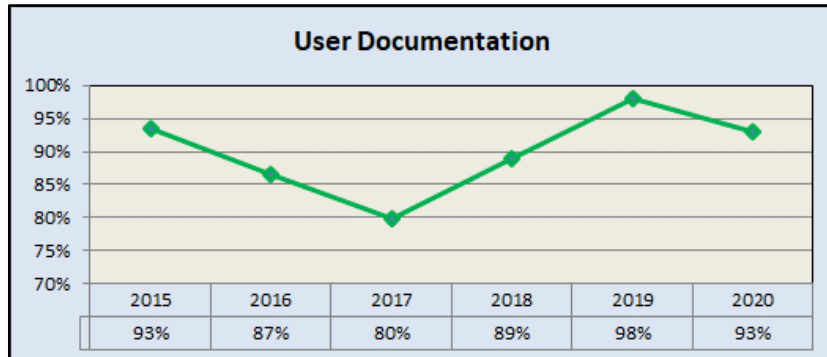


FY20 Compute Facility Performance	BNL	# of Satisfied responses	Total responses	FNAL	# of Satisfied responses	Total responses	JLAB	# of Satisfied responses	Total responses	All Sites Combined
Overall Level of Service Satisfaction	90%	19	21	100%	18	18	100%	17	17	96%
User Documentation	100%	21	21	100%	18	18	76%	13	17	93%
User Support	100%	21	21	100%	18	18	100%	17	17	100%
Responsiveness of Site Staff	100%	21	21	100%	18	18	100%	17	17	100%
System Reliability	100%	21	21	100%	18	18	94%	16	17	98%
Ease of Access	100%	21	21	100%	18	18	94%	16	17	98%
Effectiveness of other Tools	100%	21	21	100%	18	18	100%	17	17	100%

FY19 Compute Facility Performance	BNL	FNAL
Overall Level of Service Satisfaction	100%	100%
User Documentation	96%	100%
User Support	100%	100%
Responsiveness of Site Staff	100%	100%
System Reliability	100%	100%
Ease of Access	96%	100%
Effectiveness of other Tools	92%	100%

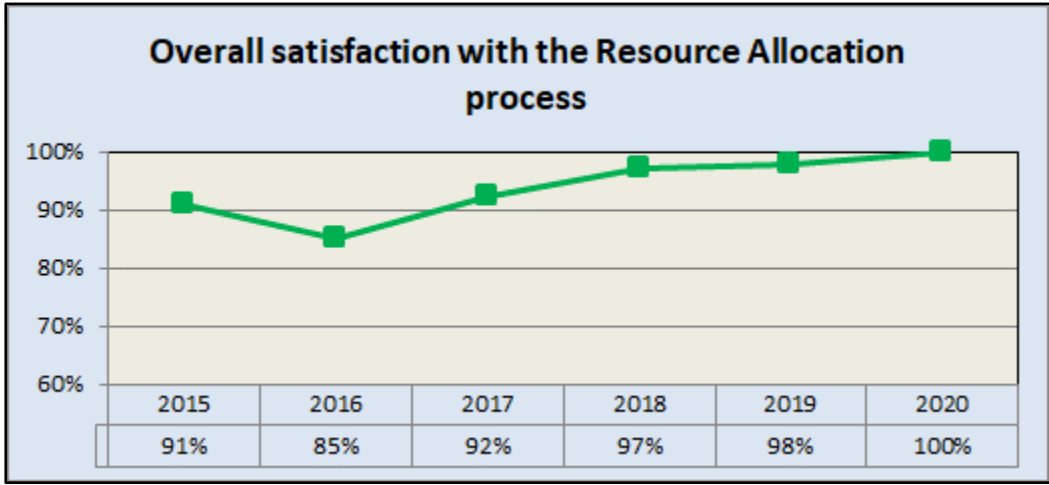
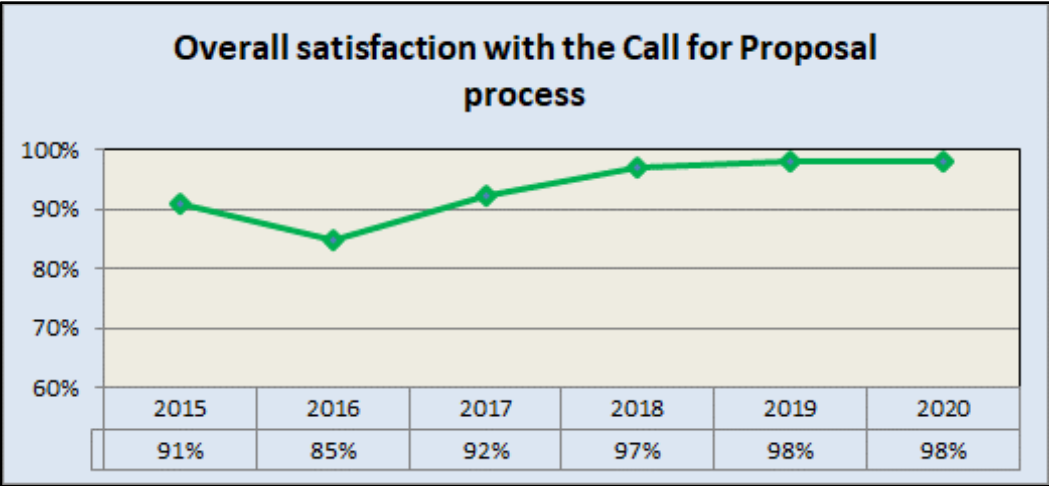
2021 User Survey Results: Compute Facilities

➤ Compute Facilities Performance Categories



2021 User Survey Results: CFP and Resource Allocation Processes

- Overall satisfaction with the CFP and Resource Allocation processes have maintained
- No KPI



2021 User Survey Results: CFP and Resource Allocation Processes

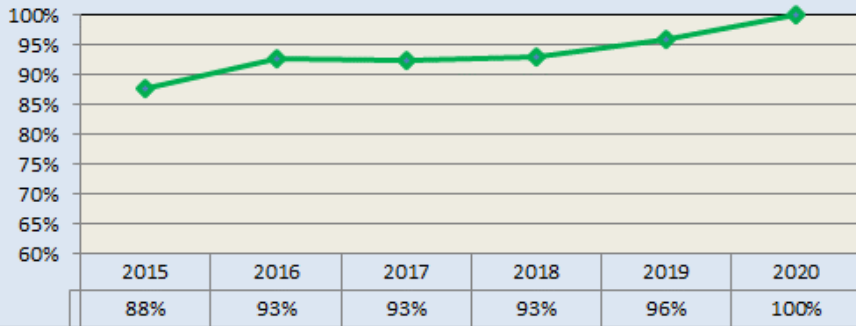
FY20 Allocation and CFP Processes	General Population	# of Satisfied responses	Total responses	Comments
Overall satisfaction with Call for Proposal process	98%	43	44	
Overall satisfaction with the Resource Allocation process	100%	21	21	
Effectiveness with which the resource allocation process awarded time among projects of similar scientific value	100%	21	21	New
Transparency of Resource allocation process	95%	20	21	
Fairness of the Resource Allocation process	95%	20	21	
Were you satisfied with the clarity & completeness of the CFP	100%	44	44	New
Were you given enough time to prepare your proposal	98%	43	44	New
Was the SPC report fair and constructive	98%	43	44	New
In your opinion do the Resource Allocations reflect the scientific priorities of the DOE Offices of High Energy Physics and Nuclear Physics	100%	21	21	New

FY19 Allocation and CFP Processes	
No set KPI Goal	General Population
Overall satisfaction with Call for Proposal and Clarity Process	98%
Overall satisfaction with the Allocation process	96%
Call for Proposal process allocates time to right project, right scale	96%
Transparency of Resource allocation process	96%
Fairness of the Resource Allocation process	96%

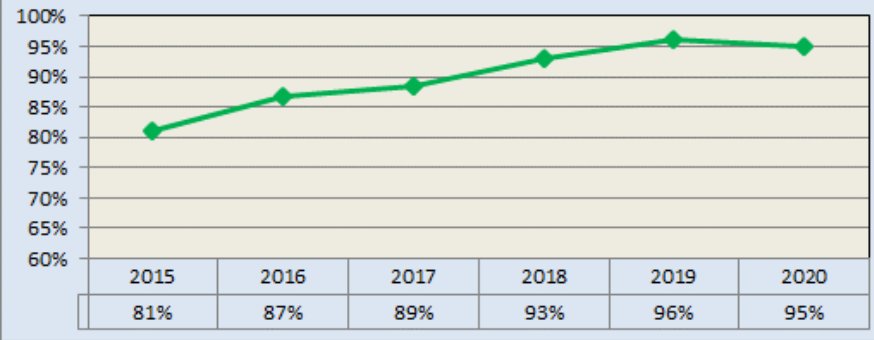
2021 User Survey Results: Allocation and CFP Processes

➤ Allocation and CFP Categories

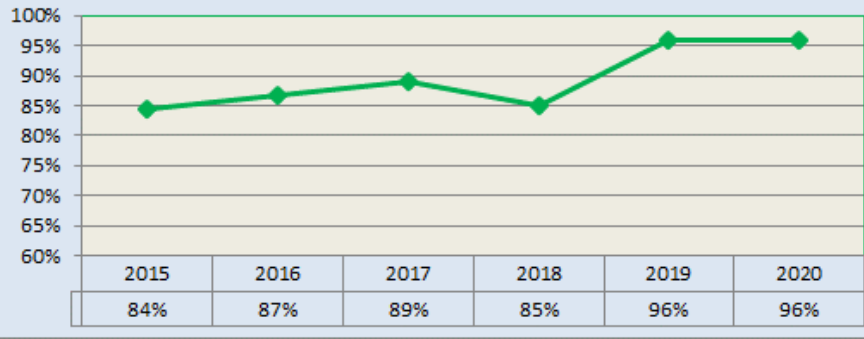
Clarity of the Call for Proposals



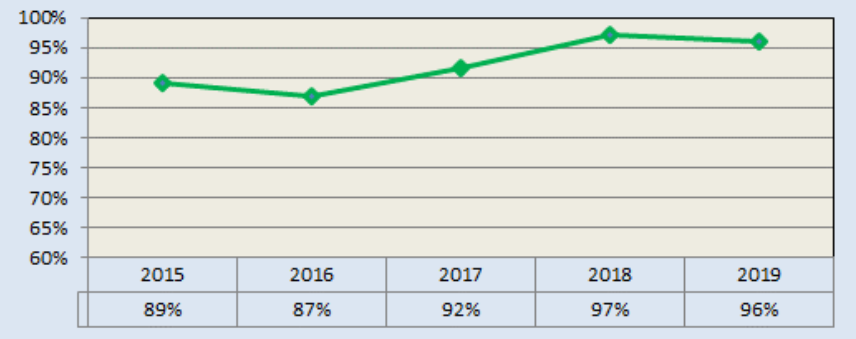
Transparency of the Resource Allocation process



Fairness of the Resource Allocation process



Allocation Process helps maximize scientific output



2021 User Survey Results: Help Desk

➤ Help Desk

- KPI is 3 days or 95% of tickets responded to within 3 business days

FY20 Helpdesk: KPI is 3 days or 95% of tickets responded to within 3 business days	BNL	# of Responses	FNAL	# of Responses	JLAB	# of Responses
What was the response time after you entered your ticket? (in working days)?						
<= 1 day		1		3		8
1 day		2		3		1
2 days		0		0		0
3 or more days		1		0		1
Total	4		6		10	

- BNL and JLAB each had 1 ticket that took 3 days to receive a response

2021 User Survey Feedback (1 of 4)

The following are just a few of the changes or responses to questions that were made on the survey. Keep in mind that implemented changes were based on input that you provided. Thank you!

BNL

- ❖ Ended up in scavenger queue despite nominally not having exhausted allocation because it was possible for other USQCD users to overuse within the overall USQCD allocation.
 - **Response:** We have addressed this concern. We are allowing the project to finish allocations. Allocations will continue to run in scavenger mode using QOS without using other's allocations
- ❖ For the GPU system, the end of the allocation year was a bit nerve wracking. Is there a better way to handle allocations so USQCD users don't consume other USQCD users' allocations?
 - **Response:** The BNL policy addresses how the allocations for USQCD users are handled. We are allowing the project to finish allocations. Allocations will continue to run in scavenger mode using QOS without using other's allocations.

2021 User Survey Feedback (2 of 4)

FNAL

- ❖ Somewhat hard to get to documentation from USQCD website
 - **Response:** FNAL regularly asks and encourages that users provide feedback regarding the website. Please send recommendations to kschu@fnal.gov
- ❖ The pnfs archival system is the worse one that I use. It is very slow and the fact that after so many years one can still not use Globus Online to access files causes much wasted time. Fermilab needs a new system that works seamlessly with Globus Online.
 - **Response:** We cannot enable Globus online with the current system. We will be passing this comment onto the lab.

2021 User Survey Feedback (3 of 4)

Jlab

- ❖ Documentation is adequate but maybe a bit sparse for new users
Documentation is very minimalistic compared to e.g., NERSC, OLCF, or Clusters in Europe
Documentation, especially on GPUs and how to build code linking to cuda libraries, could be updated and improved.
 - Response:
 1. We are in the process of migrating from existing “Drupal” website authoring tool to ServiceNow Knowledge base articles. This will make it easier to edit web pages esp. the FAQs section by operations staff who respond to user incident tickets on a regular basis and ServiceNow has superior “search” capabilities compared to Drupal.
 2. Enhance the web content to make it easy for a “new user” to, at a minimum, be able to compile a hello world MPI program on all available cluster types.
 3. After applying the above changes, solicit feedback using the LQCD users mailing list. Apply appropriate recommendations, as necessary.
- ❖ Some nodes have been problematic at times, but otherwise general uptime has seemed good.
 - Response: JLab LQCD Operations team did a recent round of hardware consolidation to clean up failed/unreliable nodes on the 16p and 18p clusters. 16p has been reduced from 264 to 256 and 18p from 180 to 176 nodes for the upcoming USQCD allocation year.

2021 User Survey Feedback (4 of 4)

Call for Proposal

- ❖ From year to year the mismatch between the amount of work needed to complete the proposal in relation to the awarded resources grows
 - **Response:** The SPC has worked to simplify the CFP and reduce the amount of work for proponents. Continuing projects can avoid extended science justification. Long term storage and computing CFP folded into one CFP at request of SPC to reduce work for users and the SPC.

- ❖ Eliminate the extra round of questions after submission
 - **Response:** The questions aid the SPC and help their evaluation of the proposal.

Summary

- Operations continue to run smoothly JLAB, BNL and FNAL. We receive excellent service and support from all labs.
- Site Managers and their support teams strive to provide the best service and support possible.
- The institutional cluster model continues to serve us well.
- Please submit jobs and use your allocations according to the run plans submitted with your proposals.
- We appreciate your participation in our Annual User Survey and have made improvements based on your input – keep the feedback coming.

***Thank you for keeping
our systems busy!***

Questions?